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ABSTRACT

A summary report is presented of the program that was begun in 1970 in three elementary schools located in a predominantly Hispanic area of the city. The study is divided into four main headings: program description, evaluation design, findings and limitations. The description of the program includes the cultural and social context; the project staff, which represents varying degrees of bilinguality; the project design; classroom organization; and home language usage. The second section discusses the composition of the control and bilingual groups, data derived from analyses of tests, and performance of students over a six-year period. The findings report on performance and trends in reading and math with reference to a control group within the school district and to two main groups of students -- those who were enrolled continuously in the program for three to five years and those who were enrolled in a given year but who did not qualify for inclusion in the longitudinal groups. The limitations described concern the small sample sizes and the non-random basis of assignment to the bilingual group. The favorable conclusions are reported to be at variance with those of the AIR Study ("The Identification and Description of Exemplary Bilingual Education Programs"). Tables and graphs representing pretest, posttest, mean gains and grade equivalents are appended. (AMH)

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Longitudinal Study
Title VII Bilingual Program
Santa Fe Public Schools
Santa Fe, New Mexico

Dr. Philip Miller, Superintendent
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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INTRODUCTION

This monograph was produced in response to the widely reported conclusions of the AIR study* criticizing the effects of the Title VII programs that were analyzed.

Some of the conclusions are as follows:

1) While there were instances of Title VII impact in some subjects in some grades, the overall-across-grade total Title VII student analyses showed that Title VII does not appear to be having a consistent significant impact in meeting its goals as set forth in the legislation.
2) Across grades when total Title VII and non-Title VII comparisons were made, the Title VII students in this study appear to be doing poorer in English than the non-Title VII students. In terms of Mathematics across grades, they appear to be performing about the same as non-Title VII students.
3) Relative to national norms, Title VII Hispanic students across grades were performing at about the 20th percentile in English Reading and at about the 30th percentile in Mathematics.

It is interesting to note that AIR in a previous study** identified the Santa Fe program as one of seven exemplary programs. AIR did not include the

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*AIR 48300-1/78-FRV

**AIR-48300-8/75-FR(1) The Identification and Description of Exemplary Bilingual Education Programs

Santa Fe program in this most recent study. Whether any of the others were included can only be known by attempting to identify them from Volume II, Project Descriptions. In any case, it would seem logical and objective to have revisited all these programs and identified them as such in the current AIR impact study to observe the possibility of desirable outcomes. That they were not reported on separately can only in the kindest terms be labeled an oversight.

The study of the Santa Fe program reports conclusions at variance with 1, 2, 3 above:

1) The Title VII students showed over time increasing capability in English language skills (esp. Reading) and Mathematics.
2) The Title VII students over time in the majority of cases outperformed the non-Title VII students in Reading and Mathematics.
3) The Title VII students over time surpassed and/or matched national norms (longitudinal group) in Reading and Mathematics.

The National Dissemination and Assessment Center at California State University, Los Angeles, in keeping with its mission to publish materials and findings relevant to bilingual education, is delighted with this publication and hopes that this monograph stimulates other similar studies.

Charles F. Leyba
Director

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Program Description

Context

The project is located in the city of Santa Fe, capital of New Mexico. The city represents a remarkable symbiosis among the three most populous cultures in the state: Native American, Hispanic, and Anglo. Simply speaking, the intergroup tensions existent elsewhere are not found here.

The population of the city and its environs is largely Spanish surnamed. This is reflected in the composition of the district student population (numbering approximately 12,000), 66% of which are Hispanic in origin.

There are more Anglos living in the northeastern and eastern parts of the city. Correspondingly, more Spanish surnamed inhabitants live in the north-central and southwesterly areas.

Roughly corresponding to this latter location are found the less expensive homes, at least comparatively so. Concomitantly, there are lower incomes on the part of the wage earner. With some exceptions the lower SES families are located here. As one moves in a southwesterly direction from the center of the city, the homes are smaller and of adobe construction. The boundaries for this segment of the city are the railroad tracks on the east and, on the north, Alameda and San Francisco Streets.

Agua Fria Street runs through the center of this segment of the city, and it is here that the three elementary schools are located in which the Title VII program operated from grades one through six. The project was funded for grade one in 1970-71 and has expanded vertically through federal funding, a single grade at a time at each of the three schools.

Because of the high concentration of Spanish surnamed persons in this part of the city, these students represent approximately 80.0% of the student body at each of the schools.*

General estimates have it that 40% of the district dropouts are attributed to students residing in and around the attendance areas served by the schools in the Title VII program. And, while the area combines 18% of the county's population, 63% of the area's families are receiving various forms of health and welfare services.**

Project Staff

During the seven years of the Title VII project at the elementary school level, all staff from aides to teachers to principals, project director, instructional materials coordinator and secretaries have been bilingual. Their bilinguality represents various shades of strength. In all cases except one, the dominant language is English. And, again, with a single exception, abilities in the use of Spanish have varying shades.

A word about the larger community serves partially to explain this. The Spanish surnamed population of northern New Mexico has preserved its language since the early 1600's. But not without a great deal of code switching and borrowing. As a result Spanish and English in everyday life are intermingled. Where Spanish is used exclusively, it is in more familiar situations, the English in more public ones, a type of diglossic situation.

Moreover, as earlier mentioned, the cultures are in a state of continued interchange and amity. Not surprisingly, then, many Anglos also

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*1976-77 Civil Rights Survey

**City Planning Department

speak Spanish. But relative to the subject at hand, all the Spanish surnamed families are bicultural and in varying degrees bilingual. So are the community's teachers. And, if some teachers are quite fluent in Spanish, it is generally because of additional study.

The staff has enjoyed great stability. The director has held his position for over six years and the teachers have been in theirs since the project's inception. This contributes to an accumulation of practical wisdom in project management and classroom strategies which improves the project from year to year. It also indicates that the project has been free from internal stress and from attacks on the part of the target and non-target constituencies.

Project Design

The students in the project have the same language characteristics as described above in speaking of the community. The students are bilingual, stronger in English than in Spanish and for the most part deficient in both languages. It is precisely because of coming from a bilingual home and their limited English speaking proficiency that the students and the schools they attend are eligible for Title VII funding. And this characteristic applies to virtually all students with Spanish surnames.

Selection, then, for inclusion in the Title VII project was not a matter of finding students needing the services of the project, but, rather, admitting students whose parents volunteered them for the program. This was true of both the Spanish surnamed and Anglo students. These latter were included for integration purposes and the ratio of the former to the latter over seven years was 70-30 percent respectively. In any given grade and year of the project there were 65 Title VII students.

Classroom Organization

In general, the classrooms are of the quasi-open variety, meaning that tables are situated in the room to accommodate small groups of students working individually or cooperatively at various tasks.

Along the walls are located special topic or interest centers and oral language arts listening posts. Interest centers commonly found are terraria, preserved specimens, tables for arts' projects, and small book collections.

The room displays reflect the seasons, national or local cultural events, subject matter commonly taught, and student work. The language accompanying the displays is uniformly bilingual, with the home language accounting for 30-45% of the text.

Expectedly, the displays in the rooms vary in quantity and quality according to the sense of efficacy of each teacher. The teachers are above average, however, in utilizing wall space to create learning environments for the children. Much of the content of the displays is employed to draw attention to and enforce the learning objectives of the project - a detail attended to by the director and emphasized in evaluation reports.

Home Language Usage*

The reported use of Spanish as a medium of instruction in the project schools oscillated between 30% and 50% of the school day. At one school, throughout the 6 years of the program, Spanish was used 30-35% of the time. At another, Spanish was used 25% of the time at the beginning of grade one with a goal of 50% by the end of that year. At another school, over the

*18 teachers participated in the project during the 6 years.

years, Spanish was used 40-50% of the day.

The topics most commonly taught in Spanish were reading and language arts. Three teachers indicated they used Spanish to teach math in addition to these subjects. The Magic Circle, social studies, and science were also reported as taught in Spanish by 3 teachers, one for each of these subjects.

Another relevant question has to do with the style of language usage. Except in nearly monolingual (Spanish) communities or barrios, there is code switching. Again, the amount of this varies depending on the degree of assimilation to the national language. In the absence of any research on the subject, it may be said that northern New Mexico represents a great degree of linguistic assimilation.

However, to increase the lexical capacities of the teachers, in-service classes in story telling, culture, science, social studies, and language arts using Spanish as a sole medium of instruction were provided for the project teachers. As a result, they demonstrated little hesitance in using Spanish exclusively in conversation, even when a topic of more than ordinary difficulty was addressed.

Evaluation Design

The evaluation of the project was structured generally along scientific lines. It must not be lost sight of that at the project level, Title VII Basic Programs are primarily geared to equalize educational opportunities, i.e., provide educational services and, in that context, to demonstrate effectiveness. They are not designed according to nor controlled by the strictest canons of scientific research. The same is true of this project. Nonetheless, because of its sound evaluation and reporting system, it was identified by the American Institutes of Research [Report 48300-8/75-FR(1)] as an exemplary bilingual education program, one of seven so designated.

As indicated earlier, the treatment group was formed of children whose parents volunteered or consented to their participation. This, in itself, introduces a bias in sampling, but is unavoidable since the regulations require parental consent. Integration or non-segregation requirements also affected the composition of the treatment group so that in each of the three schools at the grade level receiving Title VII support 30% of the children were Anglos.

The control group was selected yearly using a table of random numbers, one control group at each school. The number of children in the control group in any given year was roughly the size of a single classroom. At the beginning of each year, 25 were selected for the control group, nine from one school, eight from each of the two others. However, the actual number reported on included only those students who took both pre- and posttests. The control group received no specialized treatment from other sources of funding and thus may be considered to be representative of students receiving standard school offerings.

The treatment received by the bilingual group, in addition to the presentation of subject matter in Spanish (described earlier under Home Language Usage) consisted of presentations to the total class by the teacher, augmented by small group and individual instruction by the teacher and the aide. Each teacher had a full time aide. Provision was also made on a daily basis for independent study at interest centers or with language masters at listening posts.

Over the years, two types of evaluation were used on a pre- and post-test basis: criterion-referenced tests and the Metropolitan Achievement Test (MAT). While this study does not report performance on the basis of criterion-referenced tests, it should be noted briefly that the treatment group posted gain scores higher than those of the control group in virtually all subtests (Spanish version) and was evenly matched or superior in the English version subtests.

The MAT was administered in English. Mean gain scores* were reported for the groups, bilingual and control (cf Tables). Scores for examinees who did not take both tests were excluded from the analysis.

Statistical tests were performed on raw scores and reported as means, standard deviations, and mean gain scores. A t test was used to determine significance of the mean gain scores and should be considered as a roughly appropriate measure, given the lack of rigorous scientific controls in the structure of the project. It should be reiterated that basic programs were intended by the funding agency as service entities not R&D efforts.

The data derived from these analyses are found in the tables (pp. 14 and ff.).

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*Only the subtests Total Reading and Total Math were used in developing this study since these are the only subtests that continue throughout the six years.

In addition to the tables, performance of the students over the six year period is also reported in the graphs (pp. 30 and ff.).

The graphs report on and compare four groups:

1) the national sample
2) a control group
3) a longitudinal treatment group (LTG)
4) a non longitudinal treatment group (NLTG)

The tables report on 2, 3, and 4 above.

Groups 3 and 4 as noted were students receiving bilingual treatment or services. The LTG is formed of students who received uninterrupted bilingual treatment for the years reported on. Students in the NLTG may have received bilingual treatment 2 or more years but only intermittently, due to dropping out and later returning. The reasons for separating the bilingual group into LTG and NLTG are fairly obvious:

a) to observe whether continuous bilingual treatment makes a difference,
b) to observe, if possible, at what point continuous bilingual treatment has the effect of raising students' performance to or near national norms,
c) to observe the effects of short term bilingual treatment.

Findings

Instrumentation

The Metropolitan Achievement Tests in English were used. Grade-equivalents for Total Reading and Total Math were used to prepare the attached graphs. Statistical tests were performed on raw scores.

A. Comparison Groups

I. Treatment Groups

Students enrolled in the bilingual program were divided into two main groups for the present analyses:

a) Groups of students who were enrolled continuously in the program for three to five years. These groups are referred to in this report as the "longitudinal groups." The four longitudinal subgroups are:

Group A: Students enrolled in the bilingual program for three years beginning with grade one. (Fig 1 & 5 of graphs)

Group B: Students enrolled in the bilingual program for four years beginning with grade one. (Fig 2 & 6 of graphs)

Group C: Students enrolled in the bilingual program for four years beginning with grade three. (Fig 3 & 7 of graphs)

Group D: Students enrolled in the bilingual program for five years beginning with grade two. (Fig 4 & 8 of graphs)

b) Groups of students who were enrolled in the bilingual program in a given year but who did not qualify for inclusion in the longitudinal groups. These students are referred to as the non-longitudinal group. Thus, for example, all students enrolled in the bilingual program in grade one who were not continuously enrolled through grade three were assigned to the non-longitudinal group for comparison with Group A described above.

c) A control (non-treatment) group was identified from schools within the same district.

II. National norm group whose grade-equivalents were plotted as reference points.

Results in Reading (Figures 1 through 4 of graphs)

I. Inspection of the graphs reveals the following trends:

1) End-of-year averages show that no local group (longitudinal, non-longitudinal, and control) scored higher than the national norm group except in one instance. (See Figure 4 for the exception.) Also, local groups typically began the school years below the national norm group.

2) Overall, the control group averages are lower than the averages for bilingual groups.

3) In the majority of comparisons, the longitudinal bilingual group was superior to both the control group and the non-longitudinal bilingual group. This was true for both pretest and posttest averages.

4) Inspection of trends over time for the longitudinal group

in comparison with the national norm group do not always yield clear generalizations. The most promising longitudinal results are for Group D (Figure 4); this group caught up with the national norm group by grade five and stayed close in grade six.

II. Statistical tests using gain scores (i.e., posttest average minus pretest average) reveal the following significant differences in reading:

1) Longitudinal Group B had a significantly greater average gain than the control group in grade one. (Table 2, p. 17)
2) The non-longitudinal group selected for comparison with Group B had a significantly greater average gain than the control group in grade one. (Table 2, p. 17)
3) Longitudinal Group B had a significantly greater average gain than the control group in grade two. (Table 2, p. 18)
4) Non-longitudinal Group C had a significantly greater average gain than the longitudinal group in grade six. (Table 3, p. 24)
5) The non-longitudinal group selected for comparison with Group C had a significantly greater average gain than the control group in grade six. (Table 3, p. 24)

Results in Math (Figures 5 through 8 of graphs)

I. Inspection of the graphs reveal the following trends:

1) End-of-year averages show that the local groups (longitudinal, non-longitudinal, and control) scored higher than the national norm group in six out of fourteen cases.
2) Overall, the control group averages are lower than the averages for bilingual groups.

3) In the majority of cases, the longitudinal bilingual group was superior to both the control group and the non-longitudinal bilingual group on both the pretests and posttests.

4) Trends over time for the longitudinal group in comparison with the national norm group are not always clear. The most promising longitudinal results are for Group D. This group surpassed the national averages in grade four and maintained an equal or superior status through grade six. (See Figure 8)

II. Statistical tests using gain scores reveal the following significant differences in math:

1) The control group had a significantly greater average gain than the non-longitudinal group selected for comparison with Group A in grade one. (Table 1, p. 14)

2) Longitudinal Group A has a significantly greater average gain than the control group in grade two. (Table 1, p. 15)

3) Longitudinal Group B had a significantly greater average gain than the control group in grade one. (Table 2, p. 17)

4) The non-longitudinal group selected for comparison with Group B had a significantly greater average gain than the control group in grade one. (Table 2, p. 17)

5) Longitudinal Group B had a significantly greater average gain than the control group in grade two. (Table 2, p. 18)

6) The non-longitudinal group selected for comparison with Group B had a significantly greater average gain than the control group in grade two. (Table 2, p. 18)

7) Longitudinal Group D had a significantly greater average gain than the control group in grade two. (Table 4, p. 25)

8) The non-longitudinal group selected for comparison with Group D had a significantly greater average gain than the control group in grade two. (Table 4, p. 25)

9) The non-longitudinal group selected for comparison with Group D had a significantly greater average gain than the control group in grade five. (Table 4, p. 28)

10) The non-longitudinal group selected for comparison with Group D had a significantly greater average gain than the control group in grade six. (Table 4, p. 29)

Limitations

1) Small sample sizes were used. See Tables 1 through 4 for sample sizes.

2) Students were not assigned to the bilingual group on a random basis.

TABLE 1: Pretest, posttest and mean gains corresponding to Figures 1 and 5.

Grade 1 (Grade-equivalents not available.) (1973-1974)

	longitudinal	control	t	df
Reading	N=36	N=24		
pretest	16.7	12.3		
posttest	29.7	24.2		
difference	13.0	11.9	-0.56	58
Math				
pretest	14.0	10.4		
posttest	30.1	24.9		
difference	16.1	14.5	-0.28	58
	longitudinal	non-longitudinal	t	df
Reading	N=36	N=13		
pretest	16.7	13.8		
posttest	29.7	25.1		
difference	13.0	11.3	0.44	47
Math				
pretest	14.0	10.9		
posttest	30.1	21.2		
difference	16.1	10.3	1.82	47
	non-longitudinal	control	t	df
Reading	N=13	N=24		
pretest	13.8	12.3		
posttest	25.1	24.2		
difference	11.3	11.9	-0.93	35
Math				
pretest	10.9	10.4		
posttest	21.2	24.9		
difference	10.3	14.5	-2.35*	35

*Difference significant at .05 level.

TABLE 1 (continued)

Grade 2 (1974-1975)

	longitudinal	control	t	df
Reading	N=32	N=20		
pretest	52.5 (2.0)**	49.6 (2.0)		
posttest	69.6 (2.5)	64.0 (2.3)		
difference	17.1 (0.5)	14.4 (0.3)	0.85	50
Math				
pretest	38.1 (1.7)	35.9 (1.6)		
posttest	55.7 (3.1)	47.2 (2.2)		
difference	17.6 (1.4)	11.3 (0.6)	2.82*	50

	longitudinal	non-longitudinal	t	df
Reading	N=32	N=22		
pretest	52.5 (2.0)	44.5 (1.9)		
posttest	69.6 (2.5)	64.6 (2.3)		
difference	17.1 (0.5)	20.1 (0.4)	-0.87	52
Math				
pretest	38.1 (1.7)	35.7 (1.6)		
posttest	55.7 (3.1)	52.1 (2.5)		
difference	17.6 (1.4)	16.4 (0.9)	0.49	52

	non-longitudinal	control	t	df
Reading	N=22	N=20		
pretest	44.5 (1.9)	49.6 (2.0)		
posttest	64.6 (2.3)	64.0 (2.3)		
difference	20.1 (0.4)	14.4 (0.3)	1.59	40
Math				
pretest	35.7 (1.6)	35.9 (1.6)		
posttest	52.1 (2.5)	47.2 (2.2)		
difference	16.4 (0.9)	11.3 (0.6)	1.88	40

*Difference significant at .05 level.

**Grade-equivalents are in parentheses.

TABLE 1 (continued)

Grade 3 (1975-1976)

	longitudinal	control	t	df
Reading	N=32	N=19		
pretest	58.1 (2.6)	43.5 (2.4)		
posttest	72.6 (3.4)	57.7 (2.6)		
difference	14.5 (0.8)	14.2 (0.2)	0.10	49
Math				
pretest	66.6 (2.7)	52.1 (2.4)		
posttest	87.4 (3.6)	70.8 (3.1)		
difference	20.8 (0.9)	18.7 (0.7)	0.71	49

	longitudinal	non-longitudinal	t	df
Reading	N=32	N=19		
pretest	58.1 (2.6)	57.3 (2.6)		
posttest	72.6 (3.4)	70.4 (3.2)		
difference	14.5 (0.8)	13.1 (0.6)	0.45	49
Math				
pretest	66.6 (2.7)	62.1 (2.5)		
posttest	87.4 (3.6)	81.5 (3.4)		
difference	20.8 (0.9)	19.4 (0.9)	0.45	49

	non-longitudinal	control	t	df
Reading	N=19	N=19		
pretest	57.3 (2.6)	43.5 (2.4)		
posttest	70.4 (3.2)	57.7 (2.6)		
difference	13.1 (0.6)	14.2 (0.2)	-0.27	36
Math				
pretest	62.1 (2.5)	52.1 (2.4)		
posttest	81.5 (3.4)	70.8 (3.1)		
difference	19.4 (0.9)	18.7 (0.7)	0.24	36

TABLE 2: Pretest, posttest and mean gains corresponding to Figures 2 and 6.

Grade 1 (Grade-equivalents not available.) (1972-1973)

	longitudinal	control	t	df
Reading	N=23	N=18		
pretest	12.7	11.2		
posttest	29.9	22.6		
difference	17.2	11.4	2.97*	39
Math				
pretest	10.7	12.6		
posttest	29.4	22.2		
difference	18.7	9.6	4.11*	39
	longitudinal	non-longitudinal	t	df
Reading	N=23	N=35		
pretest	12.7	12.7		
posttest	29.9	27.8		
difference	17.2	15.1	1.32	56
Math				
pretest	10.7	12.5		
posttest	29.4	28.9		
difference	18.7	16.4	1.56	56
	non-longitudinal	control	t	df
Reading	N=35	N=18		
pretest	12.7	11.2		
posttest	27.8	22.6		
difference	15.1	11.4	2.14*	51
Math				
pretest	12.5	12.6		
posttest	28.9	22.2		
difference	16.4	9.6	3.60*	51

*Difference significant at .05 level.

TABLE 2 (continued)

Grade 2 (1973-1974)

	longitudinal	control	t	df
Reading	N=23	N=17		
pretest	47.5 (2.0)	40.9 (1.8)		
posttest	70.9 (2.5)	54.1 (2.1)		
difference	23.4 (0.5)	13.2 (0.3)	2.21*	38
Math				
pretest	37.3 (1.7)	32.5 (1.5)		
posttest	55.0 (2.9)	43.6 (2.0)		
difference	17.7 (1.2)	11.1 (0.5)	2.51*	38
	longitudinal	non-longitudinal	t	df
Reading	N=23	N=34		
pretest	47.5 (2.0)	45.8 (1.9)		
posttest	70.9 (2.5)	61.8 (2.2)		
difference	23.4 (0.5)	16.0 (0.3)	1.96	55
Math				
pretest	37.3 (1.7)	33.9 (1.6)		
posttest	55.0 (2.9)	50.9 (2.4)		
difference	17.7 (1.2)	17.0 (0.8)	0.24	55
	non-longitudinal	control	t	df
Reading	N=34	N=17		
pretest	45.8 (1.9)	40.9 (1.8)		
posttest	61.8 (2.2)	54.1 (2.1)		
difference	16.0 (0.3)	13.2 (0.3)		
Math				
pretest	33.9 (1.6)	32.5 (1.5)		
posttest	50.9 (2.4)	43.6 (2.0)		
difference	17.0 (0.8)	11.1 (0.5)	2.32*	49

*Difference significant at .05 level.

TABLE 2 (continued)

Grade 3 (1974-1975)

	longitudinal	control	t	df
Reading	N=23	N=19		
pretest	55.4 (2.5)	53.3 (2.5)		
posttest	70.4 (3.2)	65.9 (3.0)		
difference	15.0 (0.7)	12.6 (0.5)	0.59	40
Math				
pretest	66.9 (2.7)	63.6 (2.6)		
posttest	74.3 (3.1)	72.7 (3.1)		
difference	7.4 (0.4)	9.1 (0.5)	-0.49	40

	longitudinal	non-longitudinal	t	df
Reading	N=23	N=25		
pretest	55.4 (2.5)	56.0 (2.6)		
posttest	70.4 (3.2)	71.3 (3.3)		
difference	15.0 (0.7)	15.3 (0.7)	-0.07	46
Math				
pretest	66.9 (2.7)	67.0 (2.7)		
posttest	74.3 (3.1)	74.3 (3.1)		
difference	7.4 (0.4)	7.3 (0.4)	0.03	46

	non-longitudinal	control	t	df
Reading	N=25	N=19		
pretest	56.0 (2.6)	53.3 (2.5)		
posttest	71.3 (3.3)	65.9 (3.0)		
difference	15.3 (0.7)	12.6 (0.5)	0.65	42
Math				
pretest	67.0 (2.7)	63.6 (2.6)		
posttest	74.3 (3.1)	72.7 (3.1)		
difference	7.3 (0.4)	9.1 (0.5)	-0.43	42

TABLE 2 (continued)

Grade 4 (1975-1976)

	longitudinal	control	t	df
Reading	N=23	N=19		
pretest	56.5 (3.7)	45.3 (3.2)		
posttest	66.3 (4.3)	55.5 (3.6)		
difference	9.8 (0.6)	10.2 (0.4)	-0.20	40
Math				
pretest	60.4 (3.6)	48.1 (3.2)		
posttest	78.4 (4.5)	67.6 (4.0)		
difference	18.0 (0.9)	19.5 (0.8)	-0.39	40
	longitudinal	non-longitudinal	t	df
Reading	N=23	N=27		
pretest	56.5 (3.7)	54.0 (3.5)		
posttest	66.3 (4.3)	63.6 (4.2)		
difference	9.8 (0.6)	9.6 (0.7)	0.07	48
Math				
pretest	60.4 (3.6)	59.6 (3.6)		
posttest	78.4 (4.5)	76.7 (4.4)		
difference	18.0 (0.9)	17.1 (0.8)	0.29	48
	non-longitudinal	control	t	df
Reading	N=27	N=19		
pretest	54.0 (3.5)	45.3 (3.2)		
posttest	63.6 (4.2)	55.5 (3.6)		
difference	9.6 (0.7)	10.2 (0.4)	-0.26	44
Math				
pretest	59.6 (3.6)	48.1 (3.2)		
posttest	76.7 (4.4)	67.6 (4.0)		
difference	17.1 (0.8)	19.5 (0.8)	-0.79	44

TABLE 3: Pretest, posttest, and mean gains corresponding to Figures 3 and 7.

Grade 3 (1972-1973)

	longitudinal	control	t	df
Reading	N=26	N=23		
pretest	49.4 (2.5)	49.0 (2.5)		
posttest	65.7 (3.0)	65.7 (3.0)		
difference	16.3 (0.5)	16.7 (0.5)	-0.12	47
Math				
pretest	50.5 (2.4)	53.2 (2.4)		
posttest	71.0 (3.1)	70.9 (3.1)		
difference	20.5 (0.7)	17.7 (0.7)	0.86	47

	longitudinal	non-longitudinal	t	df
Reading	N=26	N=31		
pretest	49.4 (2.5)	45.5 (2.4)		
posttest	65.7 (3.0)	60.6 (2.5)		
difference	16.3 (0.5)	15.1 (0.1)	0.30	55
Math				
pretest	50.5 (2.4)	48.3 (2.3)		
posttest	71.0 (3.1)	69.5 (3.0)		
difference	20.5 (0.7)	21.2 (0.7)	-0.22	55

	non-longitudinal	control	t	df
Reading	N=31	N=23		
pretest	45.5 (2.4)	49.0 (2.5)		
posttest	60.6 (2.5)	65.7 (3.0)		
difference	15.1 (0.1)	16.7 (0.5)	-0.38	52
Math				
pretest	48.3 (2.3)	53.2 (2.4)		
posttest	69.5 (3.0)	70.9 (3.1)		
difference	21.2 (0.7)	17.7 (0.7)	1.04	52

TABLE 3 (continued)

Grade 4 (1973-1974)

	longitndinal	control	t	df
Reading	N=26	N=22		
pretest	49.7 (3.4)	39.0 (2.8)		
posttest	63.5 (4.2)	53.9 (3.5)		
difference	13.8 (0.8)	14.9 (0.7)	-0.34	46
Math				
pretest	54.9 (3.5)	45.2 (3.1)		
posttest	71.3 (4.1)	65.8 (3.9)		
difference	16.4 (0.6)	20.6 (0.8)	-1.50	46
	longitudinal	non-longitudinal	t	df
Reading	N=26	N=30		
pretest	49.7 (3.4)	45.8 (3.2)		
posttest	63.5 (4.2)	57.4 (3.7)		
difference	13.8 (0.8)	11.6 (0.5)	0.90	54
Math				
pretest	54.9 (3.5)	49.4 (3.3)		
posttest	71.3 (4.1)	66.1 (3.9)		
difference	16.4 (0.6)	16.7 (0.6)	-0.10	54
	non-longitudinal	control	t	df
Reading	N=30	N=22		
pretest	45.8 (3.2)	39.0 (2.8)		
posttest	57.4 (3.7)	53.9 (3.5)		
difference	11.6 (0.5)	14.9 (0.7)	-1.07	50
Math				
pretest	49.4 (3.3)	45.2 (3.1)		
posttest	66.1 (3.9)	65.8 (3.9)		
difference	16.7 (0.6)	20.6 (0.8)	-1.25	50

TABLE 3 (continued)

Grade 5 (1974-1975)

	longitudinal	control	t	df
Reading	N=26	N=19		
pretest	41.6 (4.8)	34.9 (4.2)		
posttest	46.1 (5.0)	43.1 (4.8)		
difference	4.5 (0.2)	8.2 (0.6)	-1.30	43
Math				
pretest	40.0 (4.5)	34.6 (4.2)		
posttest	52.4 (5.2)	45.8 (4.8)		
difference	12.4 (0.7)	11.2 (0.6)	0.38	43
	longitudinal	non-longitudinal	t	df
Reading	N=26	N=33		
pretest	41.6 (4.8)	41.6 (4.8)		
posttest	46.1 (5.0)	45.8 (5.0)		
difference	4.5 (0.2)	4.2 (0.2)	0.14	57
Math				
pretest	40.0 (4.5)	42.9 (4.7)		
posttest	52.4 (5.2)	52.8 (5.3)		
difference	12.4 (0.7)	9.9 (0.6)	0.85	57
	non-longitudinal	control	t	df
Reading	N=33	N=19		
pretest	41.6 (4.8)	34.9 (4.2)		
posttest	45.8 (5.0)	43.1 (4.8)		
difference	4.2 (0.2)	8.2 (0.6)	-1.70	50
Math				
pretest	42.9 (4.7)	34.6 (4.2)		
posttest	52.8 (5.3)	45.8 (4.8)		
difference	9.9 (0.6)	11.2 (0.6)	-0.42	50

TABLE 3 (continued)

Grade 6 (1975-1976)

	longitudinal	control	t	df
Reading	N=26	N=23		
pretest	51.6 (5.5)	46.0 (5.0)		
posttest	59.1 (6.1)	51.8 (5.5)		
difference	7.5 (0.6)	5.8 (0.5)	0.75	47
Math				
pretest	55.5 (5.4)	51.5 (5.2)		
posttest	67.1 (6.1)	64.1 (5.9)		
difference	11.6 (0.7)	12.6 (0.7)	-0.31	47
	longitudinal	non-longitudinal	t	df
Reading	N=26	N=29		
pretest	51.6 (5.5)	46.9 (5.0)		
posttest	59.1 (6.1)	58.4 (6.0)		
difference	7.5 (0.6)	11.5 (1.0)	-2.03*	53
Math				
pretest	55.5 (5.4)	54.1 (5.3)		
posttest	67.1 (6.1)	68.2 (6.2)		
difference	11.6 (0.7)	14.1 (0.9)	-1.07	53
	non-longitudinal	control	t	df
Reading	N=29	N=23		
pretest	46.9 (5.0)	46.0 (5.0)		
posttest	58.4 (6.0)	51.8 (5.5)		
difference	11.5 (1.0)	5.8 (0.5)	3.09*	50
Math				
pretest	54.1 (5.3)	51.5 (5.2)		
posttest	68.2 (6.2)	64.1 (5.9)		
difference	14.1 (0.9)	12.6 (0.7)	0.47	50

*Difference significant at .05 level.

TABLE 4: Pretest, posttest, mean gains corresponding to Figures 4 and 8.

Grade 2 (1972-1973)

	longitudinal	control	t	df
Reading	N=16	N=9		
pretest	53.7 (2.1)	53.0 (2.0)		
posttest	64.3 (2.3)	64.4 (2.3)		
difference	10.6 (0.2)	11.4 (0.3)	-0.14	23
Math				
pretest	39.4 (1.8)	40.8 (1.9)		
posttest	52.2 (2.5)	43.7 (2.0)		
difference	12.8 (0.7)	2.9 (0.1)	2.99*	23

	longitudinal	non-longitudinal	t	df
Reading	N=16	N=25		
pretest	53.7 (2.1)	41.8 (1.8)		
posttest	64.3 (2.3)	56.0 (2.1)		
difference	10.6 (0.2)	14.2 (0.3)	-1.01	39
Math				
pretest	39.4 (1.8)	31.4 (1.5)		
posttest	52.2 (2.5)	48.8 (2.3)		
difference	12.8 (0.7)	17.4 (0.8)	-1.78	39

	non-longitudinal	control	t	df
Reading	N=25	N=9		
pretest	41.8 (1.8)	53.0 (2.0)		
posttest	56.0 (2.1)	64.4 (2.3)		
difference	14.2 (0.3)	11.4 (0.3)	0.54	32
Math				
pretest	31.4 (1.5)	40.8 (1.9)		
posttest	48.8 (2.3)	43.7 (2.0)		
difference	17.4 (0.8)	2.9 (0.1)	3.80*	32

*Difference significant at 0.5 level.

TABLE 4 (continued)

Grade 3 (1973-1974)

	longitudinal	control	t	df
Reading	N=16	N=19		
pretest	53.5 (2.5)	47.9 (2.5)		
posttest	69.1 (3.2)	64.3 (2.9)		
difference	15.6 (0.7)	16.4 (0.4)	-0.16	33
Math				
pretest	62.8 (2.6)	50.0 (2.3)		
posttest	83.1 (3.5)	64.9 (2.7)		
difference	20.3 (0.9)	14.9 (0.4)	1.68	33
	longitudinal	non-longitudinal	t	df
Reading	N=16	N=45		
pretest	53.5 (2.5)	44.3 (2.4)		
posttest	69.1 (3.2)	63.3 (2.9)		
difference	15.6 (0.7)	19.0 (0.5)	-0.96	59
Math				
pretest	62.8 (2.6)	54.5 (2.4)		
posttest	83.1 (3.5)	74.0 (3.1)		
difference	20.3 (0.9)	19.5 (0.7)	0.21	59
	non-longitudinal	control	t	df
Reading	N=45	N=19		
pretest	44.3 (2.4)	47.9 (2.7)		
posttest	63.3 (2.9)	64.3 (2.9)		
difference	19.0 (0.5)	16.4 (0.4)	0.74	62
Math				
pretest	54.5 (2.4)	50.0 (2.3)		
posttest	74.0 (3.1)	64.9 (2.7)		
difference	19.5 (0.7)	14.9 (0.4)	1.41	62

TABLE 4 (continued)

Grade 4 (1974-1975)

	longitudinal	control	t	df
Reading	N=16	N=23		
pretest	51.4 (3.5)	39.7 (2.9)		
posttest	64.7 (4.2)	53.0 (3.5)		
difference	13.3 (0.7)	13.3 (0.6)	0.00	37
Math				
pretest	68.1 (3.9)	49.6 (3.3)		
posttest	86.3 (5.0)	67.3 (3.9)		
difference	18.2 (1.1)	17.7 (0.6)	0.11	37
	longitudinal	non-longitudinal	t	df
Reading	N=16	N=23		
pretest	51.4 (3.5)	45.1 (3.2)		
posttest	64.7 (4.2)	60.1 (3.8)		
difference	13.3 (0.7)	15.0 (0.6)	-0.57	37
Math				
pretest	68.1 (3.9)	60.3 (3.6)		
posttest	86.3 (5.0)	76.4 (4.4)		
difference	18.2 (1.1)	16.1 (0.8)	0.62	37
	non-longitudinal	control	t	df
Reading	N=23	N=23		
pretest	45.1 (3.2)	39.7 (2.9)		
posttest	60.1 (3.8)	53.0 (3.5)		
difference	15.0 (0.6)	13.3 (0.6)	0.58	44
Math				
pretest	60.3 (3.6)	49.6 (3.3)		
posttest	76.4 (4.4)	67.3 (3.9)		
difference	16.1 (0.8)	17.7 (0.6)	-0.49	44

TABLE 4 (continued)

Grade 5 (1975-1976)

	longitudinal	control	t	df
Reading	N=16	N=20		
pretest	45.8 (5.0)	33.8 (4.1)		
posttest	57.0 (5.8)	44.5 (4.9)		
difference	11.2 (0.8)	10.7 (0.8)	0.18	34
Math				
pretest	58.0 (5.6)	41.5 (4.6)		
posttest	71.0 (6.4)	50.7 (5.2)		
difference	13.0 (0.8)	9.2 (0.6)	1.58	34
	longitudinal	non-longitudinal	t	df
Reading	N=16	N=40		
pretest	45.8 (5.0)	39.2 (4.5)		
posttest	57.0 (5.8)	47.4 (5.0)		
difference	11.2 (0.8)	8.2 (0.5)	1.65	54
Math				
pretest	58.0 (5.6)	44.7 (4.8)		
posttest	71.0 (6.4)	59.8 (5.7)		
difference	13.0 (0.8)	15.1 (0.9)	-0.87	54
	non-longitudinal	control	t	df
Reading	N=40	N=20		
pretest	39.2 (4.5)	33.8 (4.1)		
posttest	47.4 (5.0)	44.5 (4.9)		
difference	8.2 (0.5)	10.7 (0.8)	-1.39	58
Math				
pretest	44.7 (4.8)	41.5 (4.6)		
posttest	59.8 (5.7)	50.7 (5.2)		
difference	15.1 (0.9)	9.2 (0.6)	2.56*	58

*Difference significant at .05 level.

TABLE 4 (continued)

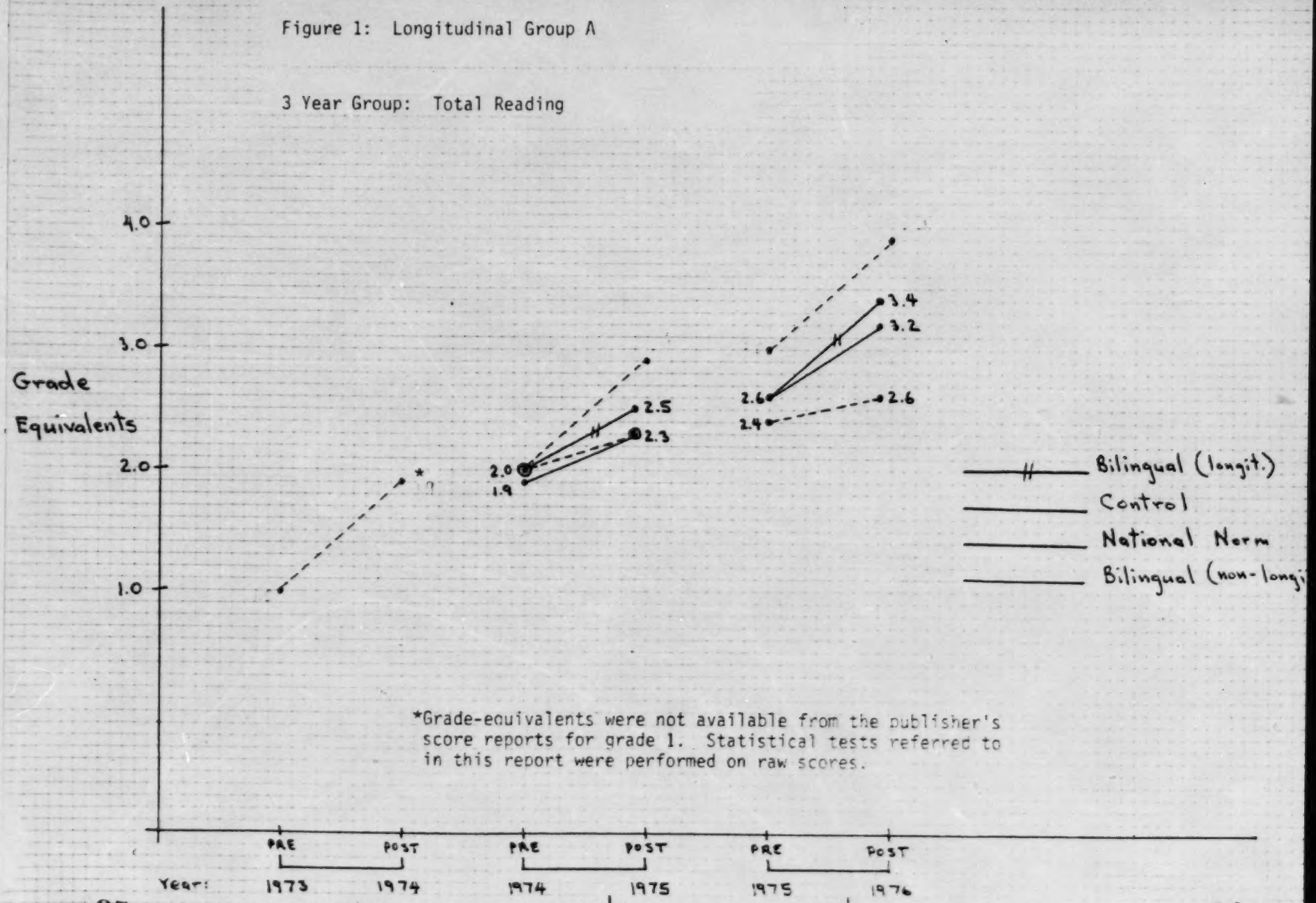
Grade 6 (1976-1977)

	longitudinal	control	t	df
Reading	N=16	N=22		
pretest	58.1 (5.9)	47.7 (5.2)		
posttest	63.7 (6.6)	53.0 (5.5)		
difference	5.6 (0.7)	5.3 (0.3)	0.15	36
Math				
pretest	66.6 (6.0)	49.0 (5.1)		
posttest	79.7 (7.0)	57.9 (5.6)		
difference	13.1 (1.0)	8.9 (0.5)	0.82	36
	longitudinal	non-longitudinal	t	df
Reading	N=16	N=54		
pretest	58.1 (5.9)	47.1 (5.0)		
posttest	63.7 (6.6)	54.9 (5.5)		
difference	5.6 (0.7)	7.8 (0.5)	-0.91	68
Math				
pretest	66.6 (6.0)	53.0 (5.3)		
posttest	79.7 (7.0)	70.2 (6.2)		
difference	13.1 (1.0)	17.2 (0.9)	-1.07	68
	non-longitudinal	control	t	df
Reading	N=54	N=22		
pretest	47.1 (5.0)	47.7 (5.2)		
posttest	54.9 (5.5)	53.0 (5.5)		
difference	7.8 (0.5)	5.3 (0.3)	1.18	74
Math				
pretest	53.0 (5.3)	49.0 (5.1)		
posttest	70.2 (6.2)	57.9 (5.6)		
difference	17.2 (0.9)	8.9 (0.5)	2.59*	74

*Difference significant at .05 level.

Figure 1: Longitudinal Group A

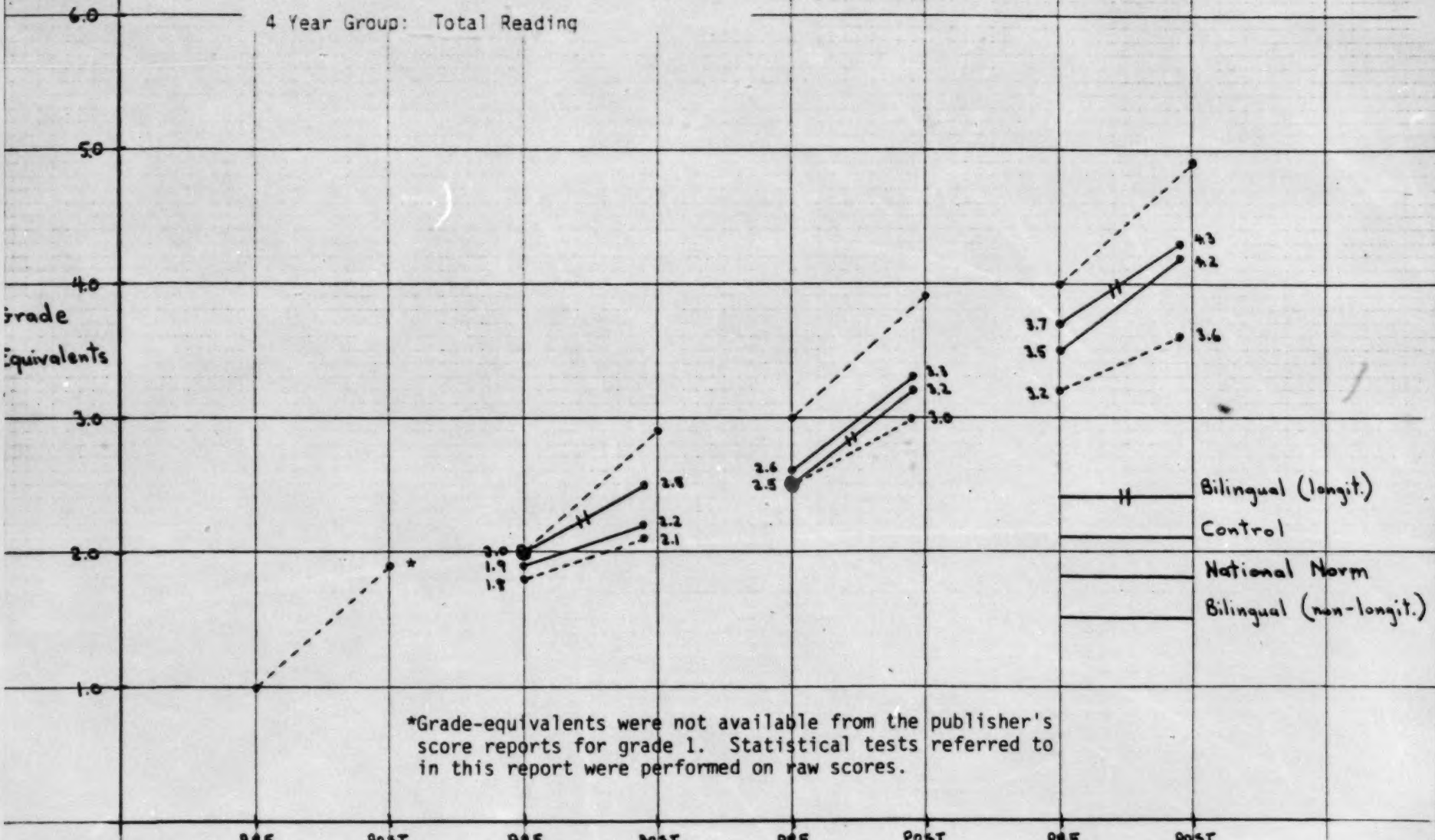
3 Year Group: Total Reading



*Grade-equivalents were not available from the publisher's score reports for grade 1. Statistical tests referred to in this report were performed on raw scores.

Figure 2: Longitudinal Group B

4 Year Group: Total Reading



*Grade-equivalents were not available from the publisher's score reports for grade 1. Statistical tests referred to in this report were performed on raw scores.

Figure 3: Longitudinal Group C

4 Year Group: Total Reading

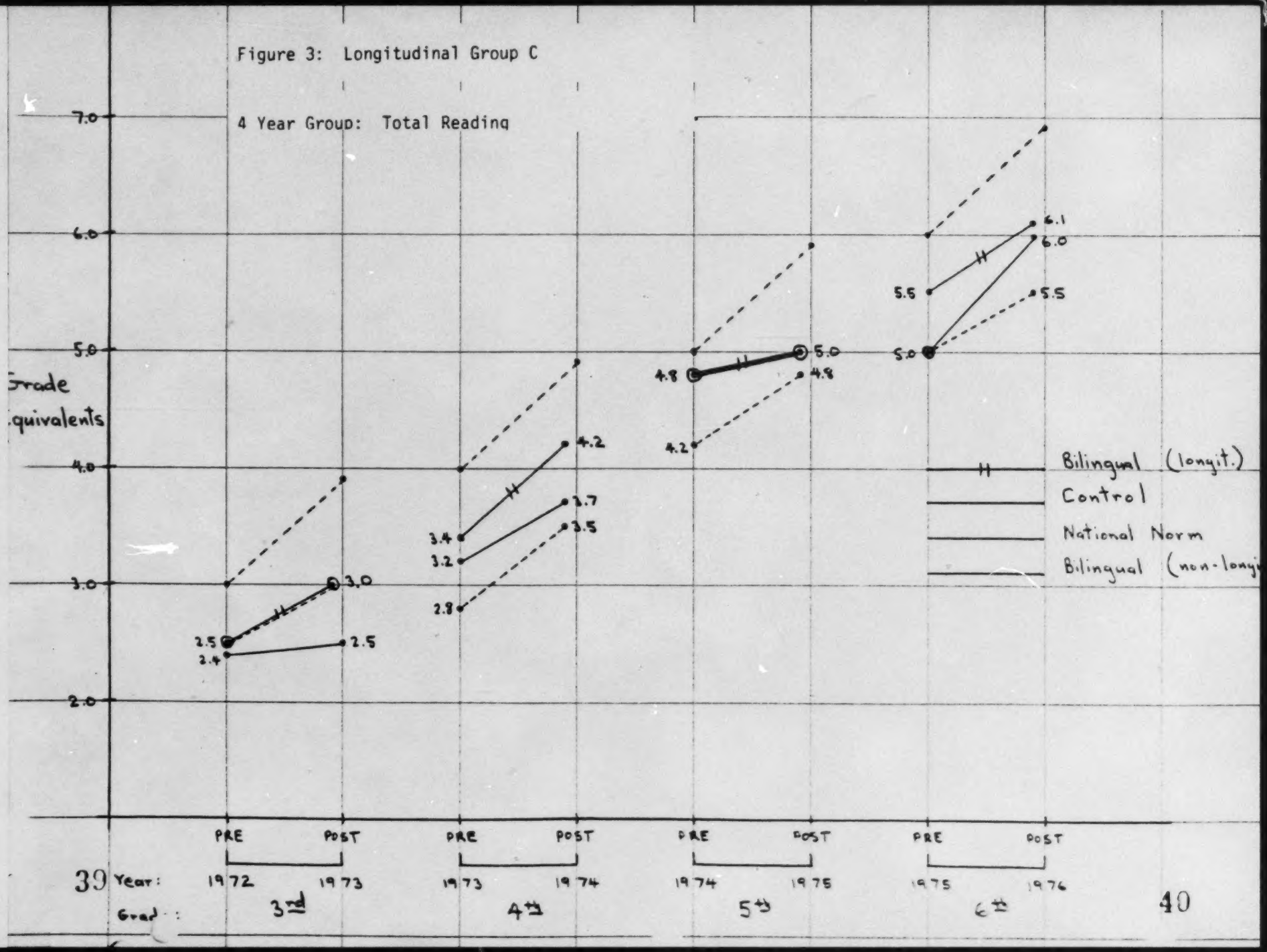


Figure 4: Longitudinal Group D

5 Year Group: Total Reading

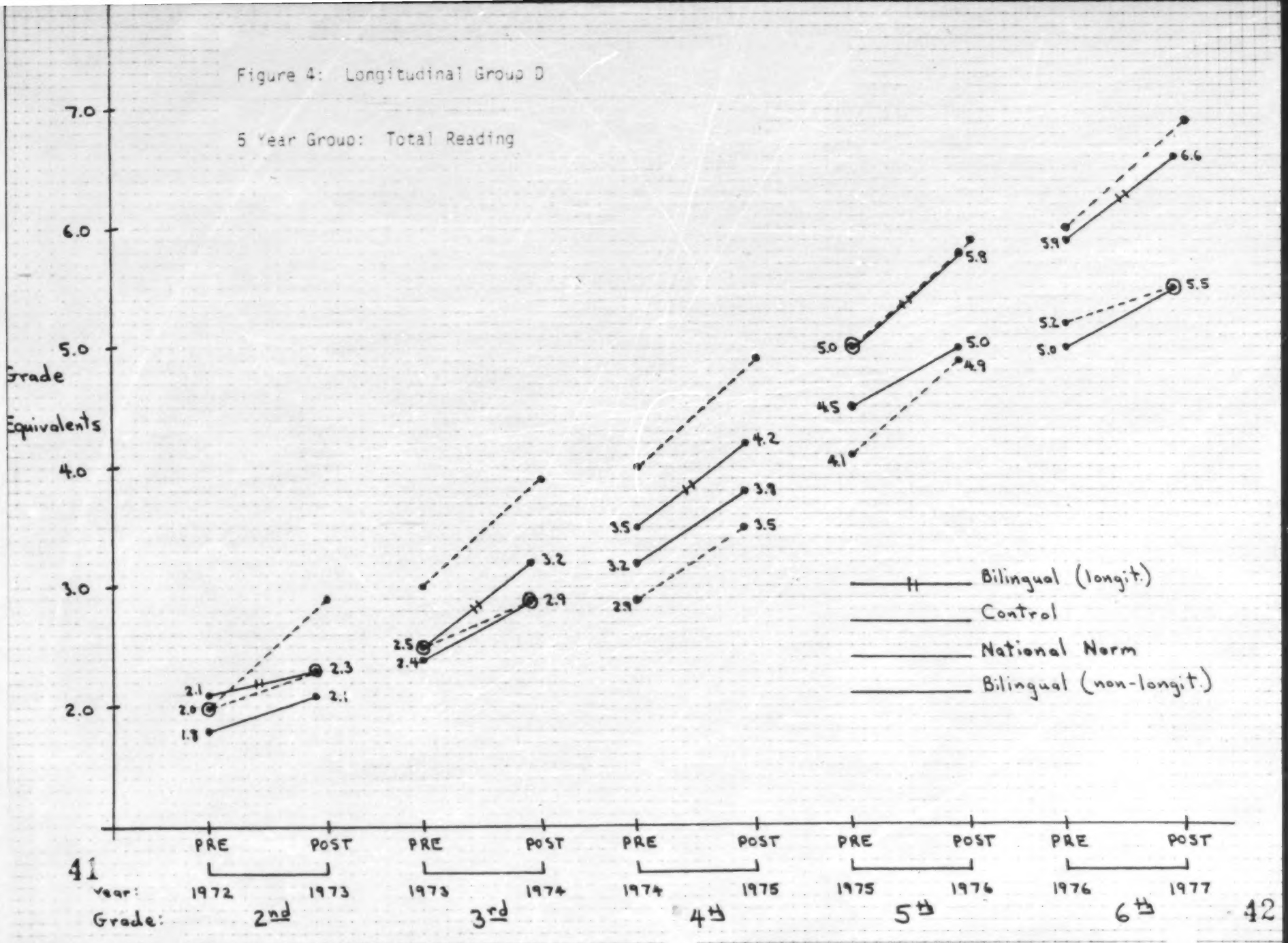
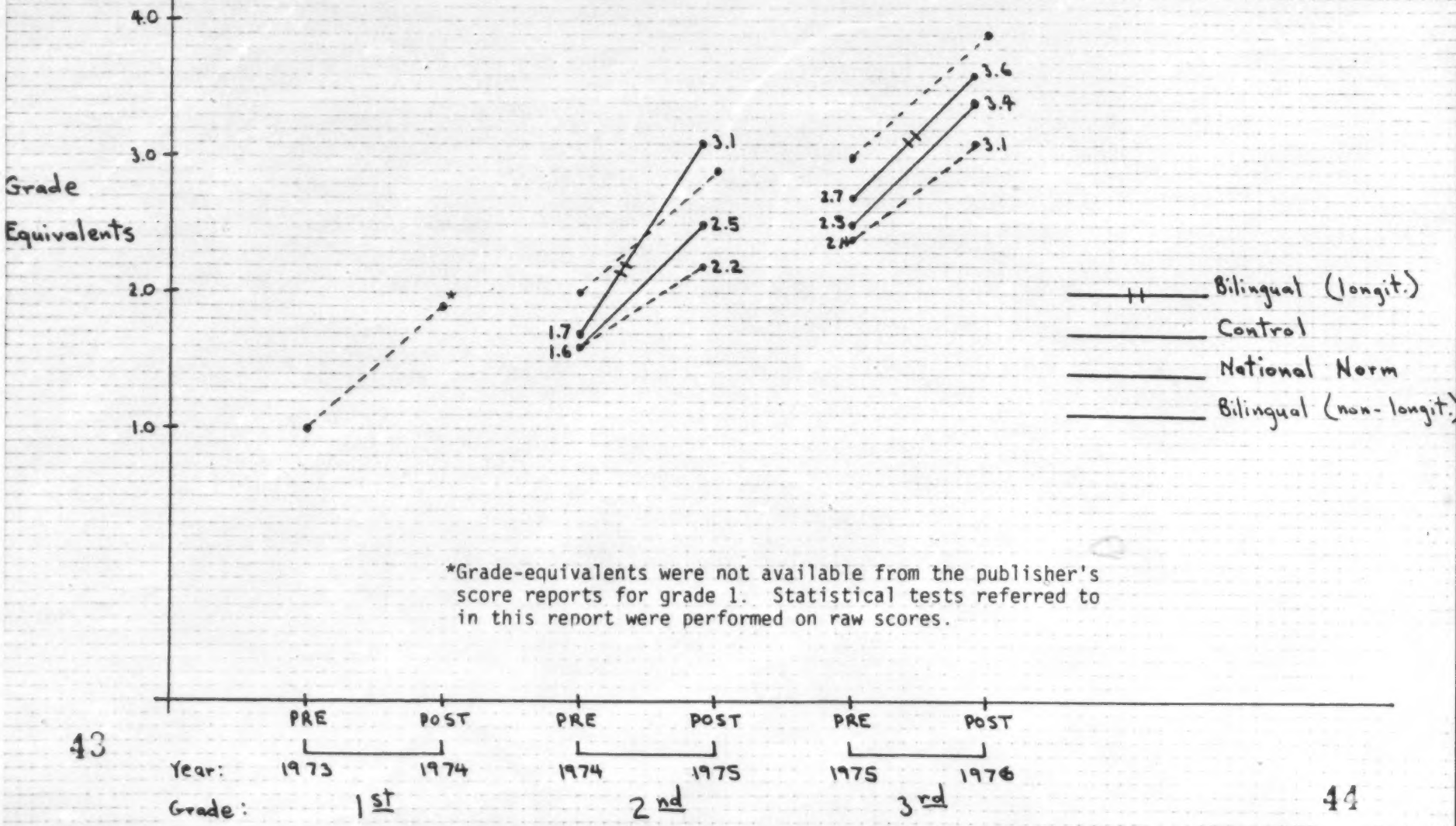


Figure 5: Longitudinal Group A

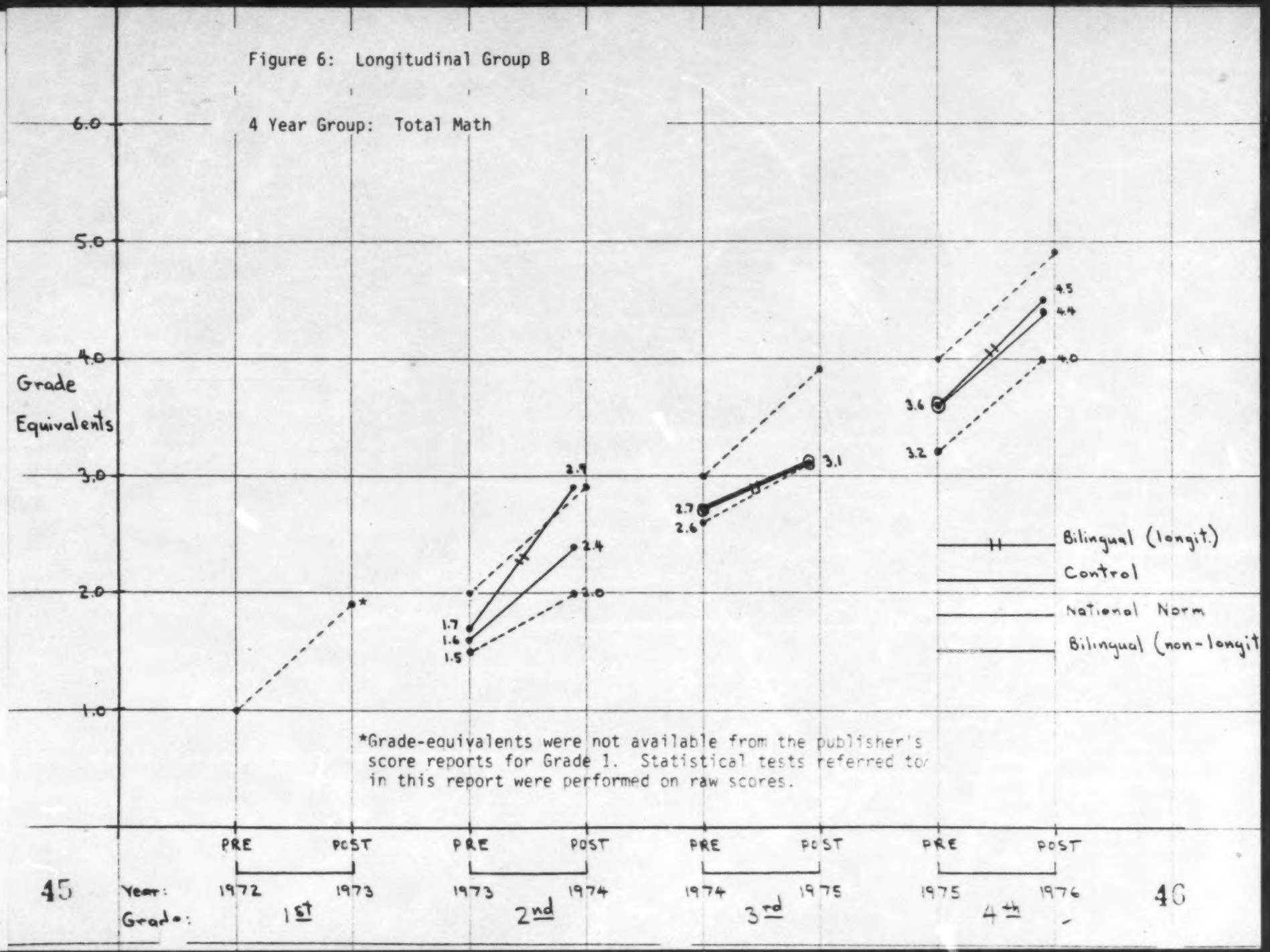
3 Year Group: Total Math



*Grade-equivalents were not available from the publisher's score reports for grade 1. Statistical tests referred to in this report were performed on raw scores.

Figure 6: Longitudinal Group B

4 Year Group: Total Math



*Grade-equivalents were not available from the publisher's score reports for Grade 1. Statistical tests referred to in this report were performed on raw scores.

Figure 7: Longitudinal Group C

4 Year Group: Total Math

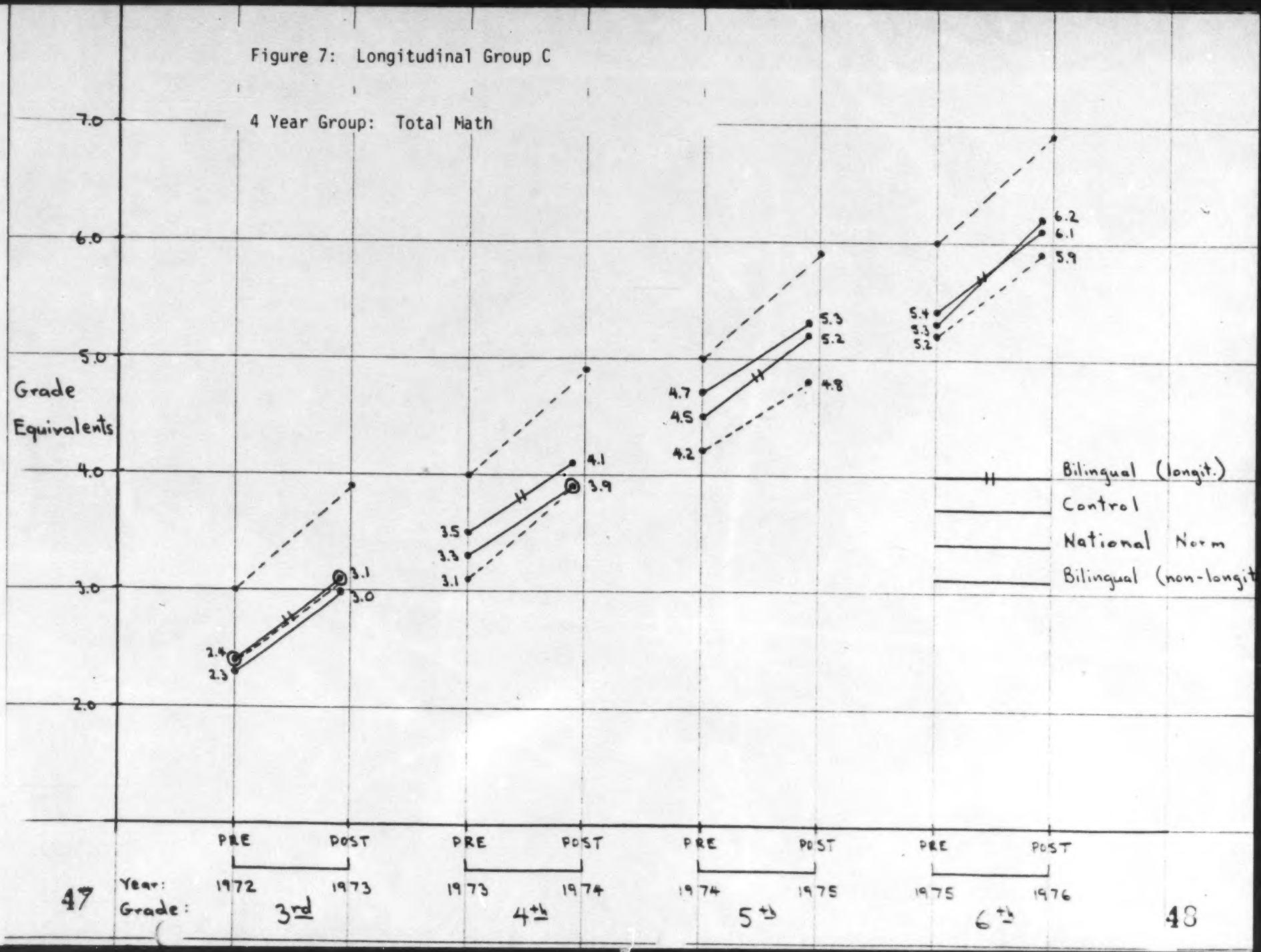


Figure 8: Longitudinal Group D

5 Year Group: Total Math